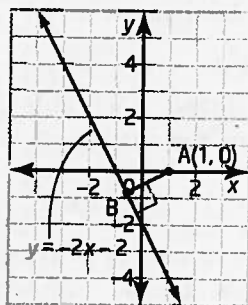


Practise

For help with question 1, see Example 1.

- Find an equation for the line containing line segment AB.

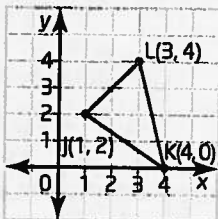


For help with questions 2 and 3, see Example 2.

- List two properties you could use to show that a triangle contains a right angle.
- A triangle has vertices $C(1, 4)$, $D(-2, 2)$, and $E(3, 1)$.
 - Draw $\triangle CDE$.
 - Use analytic geometry to verify that $\angle C$ is a right angle.

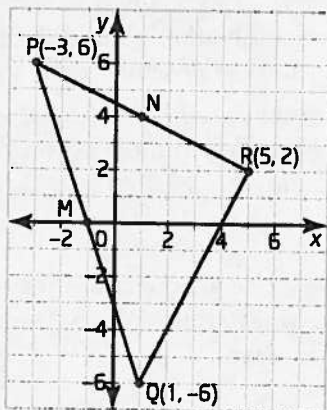
For help with question 4, see Example 3.

- Find the length of the median from vertex K.



Connect and Apply

- In $\triangle PQR$, M is the midpoint of PQ and N is the midpoint of PR.
 - Show that MN is parallel to QR.
 - Show that MN is half the length of QR.



- Determine whether the point $T(2, -1)$ lies on the right bisector of the line segment with endpoints $U(3, 5)$ and $V(-3, -1)$. Explain your reasoning.
- A quadrilateral has vertices $O(0, 0)$, $P(3, 5)$, $Q(8, 6)$, and $R(5, 1)$.
 - Determine whether OPQR is a parallelogram.
 - Describe how you could use geometry software to verify your answer to part a).
- The endpoints of the diameter of a circle are $M(-3, 5)$ and $N(9, 7)$. Determine
 - the coordinates of the centre of the circle
 - the radius of the circle
- Determine whether the triangle with vertices $A(-3, 4)$, $B(-1, -2)$, and $C(3, 2)$ is isosceles.
- Determine the shortest distance from the point $(5, 2)$ to the line represented by $y = 2x + 1$. Use a diagram to check your answer.
- Determine the shortest distance from the origin to the line represented by $y = \frac{1}{2}x - 2$.
- Determine the shortest distance from the point $D(5, 4)$ to the line represented by $3x + 5y - 4 = 0$.
- Determine the shortest distance from the point $E(1, -4)$ to the line through points $F(-5, 2)$ and $G(3, 4)$. Use a diagram to check your answer.
- Determine the shortest distance from the point $H(5, 2)$ to the line through points $J(-6, 4)$ and $K(-2, -4)$.

- 15. Use Technology** Use *The Geometer's Sketchpad*® or Cabri® Jr. to verify the solution to
- Example 1
 - Example 2
 - Example 3
- 16.** The points A(5, -3), B(-2, 4), and C(-1, 7) are three vertices of a parallelogram ABCD. Find the coordinates of vertex D. Check your answer by using a different method.
- 17.** A triangle has vertices E(2, -2), F(-4, -4), and G(0, 4).
- Determine an equation for the median from vertex E.
 - Determine the length of the median from vertex E.
- 18. a)** Draw $\triangle DEF$ with vertices D(-1, 6), E(4, 3), and F(0, -4). Then, draw the altitude from vertex D.
- b)** Find an equation for the altitude from vertex D.
- 19. Use Technology** Use *The Geometer's Sketchpad*® or Cabri® Jr. to verify your answer to question 18. Describe the method you used.
- 20.** A quadrilateral has vertices P(-5, 4), Q(-2, 8), R(6, 2), and S(3, -2).
- Show that the quadrilateral is a rectangle.
 - Determine the length of each diagonal.
 - Determine the midpoint of each diagonal.
 - What can you conclude about the diagonals of PQRS?
- 21.** A triangle has vertices J(-2, 0), K(4, -3), and L(8, 8).
- Find an equation for the altitude from vertex L to side JK.
 - Find the length of the altitude.
 - Find the area of $\triangle JKL$.
- 22. Use Technology** Use *The Geometer's Sketchpad*® or Cabri® Jr. to verify your answer to question 20. Describe the method you used.
- 23.** A cable company is connecting a new customer to its cable network. On a site plan, the customer's house has coordinates H(7, 17). The equation $y = \frac{1}{2}x + 4$ represents the existing trunk cable. The cable company wants to keep the branch to the customer's house as short as possible.
- Where should the cable company make the connection to the trunk cable?
 - How long will the branch connection be if each unit on the grid of the site plan represents 10 m?
- 24.** Dylan and Indira are hiking on the Caledon Hills section of the Bruce Trail. They have reached the point that has coordinates (6, 8) on their map of the trail. They want to hike out to the straight section of Hockley Road that joins points (4, 7) and (6, 5).
- At what point will they reach Hockley Road if they take the shortest possible route?
 - Explain why the shortest route might not be the best route.
- 25.** A utility company is running new power lines to two cottages. On a site plan, the cottages have coordinates A(6, 7) and B(13, 6) and the closest transformer is at T(13, 14). The utility will run a line straight from the transformer to one of the cottages and then connect the other cottage to that line using the shortest possible route.
- Draw a diagram on a grid to show the two possible ways to run the power lines.
 - Determine which route will require the least cable.
- 26. Use Technology** Use geometry software to verify your answer to question 25. Describe the method you used.